Potassium in Intensive Cropping Systems on Highly Weathered Soils

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Expansion of agriculture into presently uncultivated areas is occurring rapidly; rational development of such lands is essential for meeting the challenges of increasing demand for food. Goedert (1983) and Goedert et al. (1982) have reviewed the situation of cerrado agriculture: About 240 million ha of land under savanna vegetation in the tropics could be cropped, most of which is in South America and Africa. The Brazilian savanna (hereafter referred to as cerrado) occupies 150 million ha. It is estimated that at least 50 million ha are appropriate for agricultural crops. To date only about 3% of the Brazilian cerrados has been broken; thus, it represents a considerable potential for future production and increases the importance of learning how to most effectively use fertilizer in this very input-responsive area.

The rainfall, topography, drainage, and physical characteristics of the cerrado are adequate for good agricultural production, although occasional droughts during the rainy season can seriously reduce yields. The soil’s high level of acidity, high capacity for P adsorption, and the low level of natural fertility are the principal limiting factors. The dry winter season in the cerrados region lasts 100 to 150 days. During the rainy season, about 1500 mm of rain fall.

The management of K in the temperate region, where soils normally have nonexchangeable K reserves, high effective cation exchange capacity (CEC), and K fixation, has been extensively studied. Relatively little is known about the management of K in intensive food production systems established in tropical soils where the reserves of K are not sufficient to supply the quantities needed by crops for long periods of time and the supply of K to the plants must be via K fertilization.

The cerrado soils, consisting of 32% Dark Red and Red-Yellow Latosols (Oxisols), 21% quartz sands, 12% hydromorphic laterites, and other highly weathered soils (EMBRAPA-CPAC, 1982), generally have high permeability and low effective CEC, which favor leaching of K. These factors, combined with the large demand for K by the majority of crops make the management of K (sources, rates, placement, and residue management) very important. Research carried out in the Amazon jungle of Peru has shown that the basic principles of soil management for

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